What is claimed:

1. A method of measuring contaminants in water comprising:

    a. introducing into a transgenic zebrafish organism a DNA construct having the sequence of at least one regulatory response element gene operatively linked to a DNA molecule encoding at least one reporter gene such that the at least one regulatory element of the gene controls the expression of the at least one reporter gene;

    b. exposing the transgenic zebrafish to a water sample to be tested for a time sufficient to allow contaminants become bioconcentrated within the zebrafish;

    c. exposing the transgenic zebrafish to conditions permitting expression of the at least one reporter gene; and

    d. detecting the expression of the at least one reporter gene; and

    e. correlating the detected expression to known standards and thereby determining the quantity of contaminants in the water sample.

2. A method of measuring contaminants in water comprising:

    a. introducing into a transgenic zebrafish organism a DNA construct having the sequence of two or more regulatory response element genes operatively linked to a DNA molecule encoding at least one reporter gene such that a regulatory elements of the gene controls expression of the reporter gene;

    b. exposing the transgenic zebrafish to a water sample to be tested for a time sufficient to allow contaminants become bioconcentrated within the zebrafish

    c. exposing the transgenic zebrafish to conditions permitting expression of the reporter genes; and

    d. detecting the expression of the reporter genes; and

e. correlating the detected expression to known standards and thereby determining the quantity of contaminants in the water sample.

3. The method according to claim 1 wherein the regulatory response elements are promoters.

4. The method according to claim 1 wherein the regulatory response elements are selected from the group consisting of a metal response elements (MRE), the aromatic hydrocarbon response elements (AHRE), the estrogen response elements (ERE), the electrophile response elements (EPRE), and the retinoic acid response elements (RARE, RXRE).

5. The method according to claim 4 wherein the reference standard is an aquatic source containing a known contaminant concentration.

6. The method according to claim 5 wherein the transgenic zebrafish is exposed the water sample for at least one minute.

7. The method according to claim 5 wherein the transgenic zebrafish is exposed the water sample for at least 2 minutes.

8. The method according to claim 5 wherein the transgenic zebrafish is exposed the water sample for at least one hour.

9. The method according to claim 5 wherein the transgenic zebrafish is exposed the water sample for at least 12 hours.

10. The method according to claim 5 wherein the transgenic zebrafish is exposed the water sample for at least 24 hours.

11. The method according to claim 2 wherein the transgene contains at least one response element from a gene selected from the group consisting of CYP1A, CYP1B, CYP1A1CYP2D6, CYP3A, CYP3A4, MT, MT1, MT2, MTF-1, ACE1, NM01, AMT1, AHR, ARNT, AHR1, AHR2, ARNT1, ARNT2, AHRE1, AHRE2, and AHRE5.

12. The method according to claim 11 wherein the reporter element is a bioluminescent system.

13. The method according to claim 4 wherein the transgene is made up of multiple copies of the same response element.

14. The method according to claim 4 wherein the transgene contains more than one type of response element.

15. The method according to claim 4 wherein the transgene contains more than two types of response element.

16. The method according to claim 4 wherein the transgene contains two or more copies each of more than one type of response element.

17. The method according to claim 4 wherein the transgene contains additional promoters or enhancers.

18. The method according to claim 4 wherein the transgene contains at least one response element from a gene selected from the group consisting of CYP1A, CYP1B, CYP1A1CYP2D6, CYP3A, CYP3A4, MT, MT1, MT2, MTF-1, ACE1, NM01, AMT1, AHR, ARNT, AHR1, AHR2, ARNT1, ARNT2, AHRE1, AHRE2, and AHRE5.

19. The method according to claim 18 wherein the reporter element is a bioluminescent system.

20. The method according to claim 18 wherein the bioluminescent system is a luciferase or GFP system.

21. The method according to claim 18 wherein the bioluminescent system is a luciferase system.

22. The method according to claim 18 wherein the bioluminescent system is a eucaryotic luciferase system.

23. The method according to claim 18 wherein the bioluminescent system is a GFP reporter system.

24. The method according to claim 22 wherein the conditions permitting expression of the reporter gene include a sufficient amount of enzyme substrate.

25. The method according to claim 23 wherein the substrate is luciferin.

26. The method according to claim 24 wherein the detection of the expression of the reporter gene is by using a luminometer.

27. The method according to claim 18 wherein the transgenic zebrafish is exposed to a water sample to be tested continually wherein the zebrafish is removed from the water sample repeatedly at selected intervals exposed to conditions permitting expression of the reporter gene and detected for reporter gene expression wherein such repeated exposures and detecting of expression is effective to track a time course of contaminant levels.

28. The method according to claim 22 wherein the contaminant to be detected is one or more contaminants selected from the group consisting of polyaromatic hydrocarbons, electrophilic oxidants heavy metals, endocrines, and retinoids.

29. The method according to claim 22 wherein the contaminant to be detected is one or more contaminants selected from the group consisting of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, dioxin, polychlorinated biphenyls, quinones, mercury, copper, nickel, cadmium, zinc, estrogens, retinoic acid and 9-*cis*-retinoic acid.

30. The method according to claim 22 wherein the contaminant to be detected is mercury.

31. The method according to claim 28 wherein both a polyaromatic hydrocarbon and an electrophilic oxidant heavy metal are detected contaminants.

32. The method according to claim 22 wherein the contaminants become bioconcentrated at least 1,000-fold, relative to the water in the tissues of the zebrafish.

33. The method according to claim 22 wherein the fish are removed from the test water and placed immediately in a luminometer cuvette and incubated with luciferin.

34. The method according to claim 18 wherein the transgenes have a degree of homology of at least about 85% to the native genes.

35. The method according to claim 22 wherein the reporter gene has at least 85% homology to the luciferase system in the firefly Photinus pyralis.

36. The method according to claim 23 wherein the reporter gene has at least 85 % homology to the species Aequorea.

37. The method according to claim 22 wherein the species is selected from the group consisting of Aequorea victoria and Aequorea forskalea.